at least one selected from the group of electrical resistance, Hall coefficient, magnetoresistance, thermoelectric power, and current-voltage characteristics.

147. (New) The apparatus of claim 125, 126, 127, 128, 129 or 130, wherein at least one sensor on the sensor array comprises a plurality of electrical leads disposed on the substrate.

148. (New) The apparatus of claim 147, wherein said leads are deposited on said substrate, and wherein said material samples are deposited on top of said leads.

149. (New) The apparatus of claim 147, wherein said material samples are deposited on said substrate, and wherein said leads are deposited on top of said 5 or more samples.

150. (New) The apparatus of claim 125, 126, 127, 128, 129 or 130, wherein said generating means comprises a magnet that generates a magnetic field over the entire sensor array.

151. (New) The apparatus of claim 125, 126, 127, 128, 129 or 130, further comprising means for imposing a temperature gradient across said 5 or more samples in said sensor array.

152. (New) The apparatus of claim 125, 126, 127, 128, 129 or 130, wherein said sensors in said sensor array further measure temperature, and wherein said apparatus further comprises a plurality of temperature controlled elements to impose a temperature gradient across at least one sample in said sensor array.

REMARKS

The Office Action of December 5, 2001, objected to the drawings, required certain corrections in the specification and rejected claims 1-10, 13-17, 20, 21, 23, 24, 26-32 and 34-112. Dependent claims 11, 12, 18, 19, 22, 25 and 33 were objected to, but were indicated as allowable if rewritten in

independent form and if rewritten to overcome other objections as further detailed below. Applicants thank Examiner Wachsman for the indication of allowable subject matter. In response, and without conceding to or acquiescing in the propriety of any of the rejections, Applicants have amended the claims and added new claims to substantially rewrite claims 11, 18, 22 and 33 in independent form.

Drawings

The Office Action of December 5, 2001 and a draftperson's review accompanying the Office Action have required various drawing corrections. All such drawing corrections are believed to have been made by the transmittal of formal drawings accompanying the present Amendment and Response. In particular, the Office Action reads that, "labeling (i.e. in words) is needed in Figures 2A-2D, 6B, 9A-9C, 10, 13G, 16C, 16D, 17A, 17B, 18A-18C, 20A, 20B, 21A and 21B so as to facilitate an understanding of the invention from the drawings." The transmittal of formal drawings has included additional labeling in the form of numbers and words. If such labeling is still considered inadequate, Applicants are willing to further label the drawings and request that the Examiner indicate any additional labeling desired.

The Office Action reads further that, "Figures 5 and 8 have text in the drawings and Figure 8 indicates at the bottom that this figure is confidential information and puts the company's name there." Such text and indication have been removed from the formal drawings submitted herewith.

Additionally, the Office action reads that, "Insufficient margin left at the top of Figures 12E and 13C has resulted in the punching of holes through subject matter of these figures." The formal drawings are believed to have proper margins.

The draftperson's review indicated improper margins in certain drawings and undesirable legends in certain drawings. The formal drawings are believed to have proper margins and proper legends.

Specification

The Office Action reads that, "The section "RELATED CASES" on page 1 of the specification has blank spaces which are missing the U.S. application serial numbers..." and that, "the citation of the attorney docket numbers...are not necessary..." Thus, the "RELATED CASES" paragraph has been replaced with a paragraph having the serial numbers added and the docket numbers removed.

The Office Action reads that, "Page 78 of the specification refers to U.S. application serial no. 09/133,171, but does not provide the current status of this application." Such status has been incorporated into the present application.

Claim Rejections under 37 C.F.R. 1.75(a)

The Office Action reads that, "Claims 1-5 and 7-112 are objected to under 37 C.F.R. 1.75(a) for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The Office Action suggests that the term "its" in claims 1-4, 67 and 71 "adds ambiguity". Thus, in each of claims 1-4, the term "its associated sample" has been replaced by the term "said one of said 5 or more samples". Claims 67 and 71 have been cancelled.

The Office Action asks whether the term "at least one property" in claim 4 is "referring to at least one material property?" Thus, the term "at least one property" has been replaced by the term "at least one thermal property" to clear up any confusion and since the material property of claim 4 is now recited as a thermal property.

The Office Action reads that, "Claim 4, line 11, cites 'the materials library' which lacks antecedent basis." Thus, the phrase "a material in the materials library" has been replaced with the phrase "said 5 or more samples".

The Office Action reads that, "Claim 4, line 12, cites 'group of sensor' which should be 'group of sensors'". Such change has been made.

The Office Action reads that, "Claim 4, line 16, cites 'at least one material property' which it appears should be 'said at least one material property'". Such change has been made as well as changing the "material" property to a "thermal" property.

The Office Action reads that, "Claim 5, line 7, cites 'a signal routing means' but a signal routing means for doing what is being referred to here?" Thus, the term "via said signal routing means" has been added to describe how the "electronic test circuitry" sends "signals" to and receives "signals" from "said sensor array".

The Office Action reads that, "Claim 7, line 1, cites 'the property' however is this referring to 'the at least one material property'? This same type of problem also occurs in claim 23, line 1, claim 26, line 1, claim 36, line 1, claim 42, line 1". Claims 7, 26, 36 and 42 have been canceled. The term "the property" in claim 23 has been replaced by the term "the at least one thermal property" to clear up any confusion and since the material property of those claims is now recited as a thermal property

The Office Action reads that, "Claim 9, line 3, cites 'said substrate' which lacks antecedent basis in claim 5. This same type of problem also occurs in claim 11, line 3, claim 13, line 1, claim 16, line 1, claim 18, line 2, claim 20, line 1, claim 22, line 4, claim 24, line 2, claim 28, line 2, claim 31, line 2, claim 38, line 2, claim 39, line 3, claim 54, line 2, claim 55, line 2". Claims 11, 18, 22, 28, 31, 38, 39, 54 and 55 have been canceled. For claims 9, 13, 16, 20, 24 and 28, claim 5 now has antecedent basis.

The Office Action reads that "Claim 10, line 2, cites 'said sensors' but is this in fact referring to the 'at least one sensor' already recited in claim 9? This same type of problem also occurs in claim 12, line 2". Thus, the term "said sensors" in claims 10 and 12 has been changed to "said at least one sensor".

The Office Action reads that, "Claim 13, line 2, cites 'a plurality of heater/thermometers' in which it appears that 'heater' should be 'heaters'. This same type of problem also occurs in claim 16, line 3." The term "heater" has been pluralized in these claims.

The Office Action reads that, "Claim 15, line 1 cites 'said heater/thermometer' however the antecedent basis is plural. This same type of problem also occurs in claim 17, line 1." These claims now refer to "said plurality of heaters/thermometers".

The Office Action reads that, "Claim 16, line 3, cites 'said material' however the antecedent basis is 'poor thermal conducting material'." Such change has been made.

The Office Action reads that, "Claim 25, line 2, cites 'said sensor' which should be 'said at least one sensor'." Such change has been made.

The remaining rejections of the claims under 37 C.F.R. 1375(a) are believed to be moot due to the cancellation of claims 26-112.

Claim Rejections under 35 U.S.C. 102 and 103

The Office Action of December 5, 2001 rejected claims 1-10, 13-17, 20, 21, 23, 24, 26-32 and 34-112 under 35 U.S.C. 102 or 103. Claims 11, 12, 18, 19, 22, 25 and 33 were objected to as being dependent upon the rejected claims, but were indicated as allowable if written in independent form. Applicants thank Examiner Wachsman for the indication of allowable subject matter. In response, applicants have amended or added claims in the present application such that each of the independent claims represents one of the portions of allowable subject matter as indicated by Examiner Wachsman. Such response is not intended as Applicants' acquiescence in the propriety of the rejections of the other claims. Rather, such response is intended to expedite prosecution of the present application.

In the Office Action, claim 18 was indicated as allowable. Claim 18 was dependent upon multiple dependent claim 7, which was dependent upon claims 1-6. Claims 1-6 have each been presently amended to include the language of claims 7 and 18.

In the Office Action, claim 11 was indicated as allowable. Claim 11 was dependent upon multiple dependent claim 7, which was dependent upon claims 1-6. Claims 113-118 have been added to the present application to include the language of claims 1-6 respectively and each of the claims 113-118 also includes the language of claims 7 and 11.

In the Office Action, claim 22 was indicated as allowable. Claim 22 was dependent upon multiple dependent claim 7, which was dependent upon claims 1-6. Claims 119-124 have been added to the present application to include the language of claims 1-6 respectively and each of the claims 119-124 also includes the language of claims 7 and 22.

In the Office Action, claim 33 was indicated as allowable. Claim 33 was dependent upon claim 31, which was dependent upon multiple dependent claim 26, which was dependent upon claims 1-6. Claims 125-130 have been added to the present application to include the language of claims 1-6 respectively and each of the claims 125-130 also includes the language of claims 33, 31 and 26.

CONCLUSION

The actions taken in this response are in the interest of expediting prosecution and with no intention of surrendering any range of equivalents to which Applicants would otherwise be entitled.

Since the Examiner has indicated the allowability of the claims as amended and added above, Applicants request that the present application be passed to issuance at the Examiner's earliest convenience.

If the Examiner has any comments or suggestions, which could place this application in even better form, the Examiner is requested to telephone the undersigned attorney at the below-listed number.

If for some reason Applicants have not requested a sufficient extension and/or have not paid a sufficient fee for this response and/or for the extension necessary to prevent the abandonment of this application, please consider this as a request for an extension for the required time period and/or authorization to charge Deposit Account No. 50-0496 in the name of Symyx Technologies, Inc. for any fee which may be due.

Respectfully submitted,
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VERSION WITH MARKINGS TO SHOW CHANGES MADE

1. (Amended) An apparatus for characterizing one or more material properties for each of 5 or more samples, comprising:

a substrate having 5 or more sensors disposed thereon to form a sensor array, wherein each sensor is associated with one of said 5 or more samples and characterizes at least one thermal [material] property of said one of said 5 or more samples [its associated sample];

an interconnection device electrically coupled with the sensor array; and

an electronic platform that sends signals to and receives signals from said sensor array via said interconnection device, wherein the signals received by said electronic platform correspond to said at least one thermal [material] property and wherein said sensor array includes a plurality of thermometers disposed on a top surface of said substrate, and wherein said substrate includes a large area heater disposed on a bottom surface of said substrate.

2. (Amended) An apparatus for characterizing one or more material properties for each of 5 or more samples, comprising:

a substrate having 5 or more sensors disposed thereon to form a sensor array, wherein each sensor is associated with one of said 5 or more samples and characterizes at least one thermal [material] property of said one of said 5 or more samples [its associated sample];

a circuit board coupled to said sensor array;

a signal routing means coupled to said sensor array via said circuit board; and

an electronic platform that sends signals to and receives signals from said sensor array via said signal routing means, wherein said signal routing means selectively couples a sensor or a group of sensors in said sensor array to said electronic platform, and wherein the signals received by said electronic platform correspond to said at least one thermal [material] property and wherein said sensor array includes a plurality of thermometers disposed on a

top surface of said substrate, and wherein said substrate includes a large area heater disposed on a bottom surface of said substrate.

3. (Amended) An apparatus for characterizing one or more material properties for each of 5 or more samples, comprising:

a substrate having 5 or more sensors disposed thereon to form a sensor array, wherein each sensor is associated with one of said 5 or more samples and characterizes at least one thermal [material] property of said one of said 5 or more samples [its associated sample];

a circuit board coupled to said sensor array via a connector, said circuit board having a signal routing means disposed thereon;

an electronic platform that sends signals to and receives signals from said sensor array via said signal routing means, wherein said signal routing means on said circuit board selectively couples a sensor or a group of sensors in said sensor array to said electronic platform, and wherein the signals received by said electronic platform correspond to at least one thermal [material] property and wherein said sensor array includes a plurality of thermometers disposed on a top surface of said substrate, and wherein said substrate includes a large area heater disposed on a bottom surface of said substrate.

4. (Amended) An apparatus for characterizing one or more material properties for each of 5 or more samples, comprising:

a substrate having 5 or more sensors disposed thereon to form a sensor array, wherein each sensor is associated with one of said 5 or more samples and characterizes at least one thermal [material] property of said one of said 5 or more samples [its associated sample];

a circuit board including:

a signal routing means; and

electronic test circuitry for sending signals to and receiving signals from said sensor array via said signal routing means, wherein the signals received by said electronic test circuitry correspond to said at least one thermal property of said 5 or more samples [a material in the materials library], and wherein said signal routing means on said circuit board selectively couples a

sensor or a group of sensors [sensor] in said sensor array to said electronic test circuitry; and

a computer coupled to said circuit board for controlling said signal routing means and said electronic test circuitry, receiving signals generated by said electronic test circuitry, and generating data corresponding to said at least one thermal [material] property and wherein said sensor array includes a plurality of thermometers disposed on a top surface of said substrate, and wherein said substrate includes a large area heater disposed on a bottom surface of said substrate.

5. (Amended) An apparatus for characterizing material properties in a materials library, comprising:

a circuit board including:

a plurality of sensors disposed on said circuit board to form a sensor array, wherein each sensor in said sensor array measures at least one property of a material in the materials library;

a signal routing means; and

electronic test circuitry for sending signals to and receiving signals from said sensor array via said signal routing means, wherein the signals received by said electronic test circuitry correspond to said at least one property of a material in the materials library; and

a computer for controlling said plurality of sensors and said electronic test circuitry, receiving signals generated by said electronic test circuitry, and generating data corresponding to said at least one property of a material in the materials library and wherein said sensor array includes a plurality of thermometers disposed on a top surface of a substrate of said circuit board, and wherein said substrate includes a large area heater disposed on a bottom surface of said substrate.

6. (Amended) An apparatus for characterizing material properties in a materials library, comprising:

a circuit board including:

a plurality of sensors disposed on a substrate mounted on said circuit board to form a sensor array, wherein each sensor in said

sensor array measures at least one property of a material in the materials library; and

a signal routing means to route signals to and from said plurality of sensors; and

electronic test circuitry for sending signals to and receiving signals from said sensor array, wherein the signals received by said electronic test circuitry correspond to said at least one property of a material in the materials library[,]; and

a computer for controlling said plurality of sensors and said electronic test circuitry, receiving signals generated by said electronic test circuitry, and generating data corresponding to said at least one property of a material in the materials library and wherein said sensor array includes a plurality of thermometers disposed on a top surface of said substrate, and wherein said substrate includes a large area heater disposed on a bottom surface of said substrate.

8. (Amended) The apparatus of claims 1-6 [7], wherein the thermal property characterized by said sensor array is at least one selected from the group consisting of heat capacity, thermal conductivity, and thermal stability.

9. (Amended) The apparatus of claims 1-6 [7], wherein at least one sensor in said sensor array comprises:

a microthin film membrane supported by said substrate such that said sensor array is an array of microthin film windows; and

a heater/thermometer pattern disposed on said microthin film membrane.

10. (Amended) The apparatus of claim 9, wherein said microthin film membrane forming said at least one sensor [sensors] is a silicon nitride membrane, and wherein said substrate supporting said silicon nitride membranes in said sensor array is a silicon wafer.

12. (Amended) The apparatus of claims 1-6 [11], wherein said microthin film membrane forming said at least one sensor [sensors] is a silicon nitride membrane, and wherein said substrate supporting said silicon nitride membranes in said sensor array is a silicon wafer.

13. (Amended) The apparatus of claims 1-6 [7], wherein said substrate is made of a polymer sheet, and wherein said sensor array includes a plurality of heaters/thermometers [heater/thermometers] disposed on said polymer sheet.

15. (Amended) The apparatus of claim 13, wherein said plurality of heaters/thermometers is printed on said polymer sheet via lithography.

16. (Amended) The apparatus of claim 1-6 [7], wherein said substrate is made of a poor thermal conducting material that is at least 100 microns thick, and wherein said sensor array includes a plurality of heaters/thermometers disposed on said poor thermal conducting material.

17. (Amended) The apparatus of claim 16, wherein said plurality of heaters/thermometers is printed on a glass plate via lithography.

19. (Amended) The apparatus of claims 1-6 [18], wherein said substrate is made of a polymer sheet.

20. (Amended) The apparatus of claims 1-6 [7], wherein said substrate is made from a material having poor thermal conductivity and is placed on a heater block, and wherein said sensor array includes a plurality of temperature sensors disposed on the substrate such that a temperature difference between a first portion and a second portion of the substrate can be determined.

23. (Amended) The apparatus of claims 1-6 [1, 2, 3, 4, 5 or 6] wherein the at least one thermal property characterized by said sensor array is a complex dielectric constant.

25. (Amended) The apparatus of claims 1-6 [22], wherein at least one sensor in said sensor array further comprises a thermometer such that said at least one sensor can conduct a dielectric constant measurement and a thermal measurement simultaneously.

113. (New) An apparatus for characterizing one or more material properties for each of 5 or more samples, comprising:

a substrate having 5 or more sensors disposed thereon to form a sensor array, wherein each sensor is associated with one of said 5 or more samples and characterizes at least one thermal property of said one of said 5 or more samples;

an interconnection device electrically coupled with the sensor array; and an electronic platform that sends signals to and receives signals from said sensor array via said interconnection device, wherein the signals received by said electronic platform correspond to said at least one thermal property and wherein at least one sensor in said sensor array comprises:

i) a microthin film membrane supported by said substrate such that said sensor array is an array of microthin film windows;

ii) a first wire disposed on said microthin film membrane, said first wire acting as a heater and a first thermometer; and

iii) a second wire spaced apart from said first wire and disposed on said substrate, said second wire acting as a second thermometer.

114. (New) An apparatus for characterizing one or more material properties for each of 5 or more samples, comprising:

a substrate having 5 or more sensors disposed thereon to form a sensor array, wherein each sensor is associated with one of said 5 or more samples and characterizes at least one thermal property of said one of said 5 or more samples;

a circuit board coupled to said sensor array;

a signal routing means coupled to said sensor array via said circuit board; and

an electronic platform that sends signals to and receives signals from said sensor array via said signal routing means, wherein said signal routing means selectively couples a sensor or a group of sensors in said sensor array to said electronic platform, and wherein the signals received by said electronic platform correspond to said at least one thermal property and wherein at least one sensor in said sensor array comprises:

i) a microthin film membrane supported by said substrate such that said sensor array is an array of microthin film windows;

ii) a first wire disposed on said microthin film membrane, said first wire acting as a heater and a first thermometer; and

iii) a second wire spaced apart from said first wire and disposed on said substrate, said second wire acting as a second thermometer.

115. (New) An apparatus for characterizing one or more material properties for each of 5 or more samples, comprising:

a substrate having 5 or more sensors disposed thereon to form a sensor array, wherein each sensor is associated with one of said 5 or more samples and characterizes at least one thermal property of said one of said 5 or more samples;

a circuit board coupled to said sensor array via a connector, said circuit board having a signal routing means disposed thereon;

an electronic platform that sends signals to and receives signals from said sensor array via said signal routing means, wherein said signal routing means on said circuit board selectively couples a sensor or a group of sensors in said sensor array to said electronic platform, and wherein the signals received by said electronic platform correspond to at least one thermal property and wherein at least one sensor in said sensor array comprises:

i) a microthin film membrane supported by said substrate such that said sensor array is an array of microthin film windows;

ii) a first wire disposed on said microthin film membrane, said first wire acting as a heater and a first thermometer; and

iii) a second wire spaced apart from said first wire and disposed on said substrate, said second wire acting as a second thermometer.

116. (New) An apparatus for characterizing one or more material properties for each of 5 or more samples, comprising:

a substrate having 5 or more sensors disposed thereon to form a sensor array, wherein each sensor is associated with one of said 5 or more samples and characterizes at least one thermal property of said one of said 5 or more samples;

a circuit board including:

a signal routing means; and

electronic test circuitry for sending signals to and receiving signals from said sensor array via said signal routing means, wherein the signals received by said electronic test circuitry correspond to said at least one thermal property of said one of said 5 or more samples, and wherein said signal routing means on said circuit board selectively couples a sensor or a group of sensors in said sensor array to said electronic test circuitry; and

a computer coupled to said circuit board for controlling said signal routing means and said electronic test circuitry, receiving signals generated by said electronic test circuitry, and generating data corresponding to said at least one thermal property and wherein at least one sensor in said sensor array comprises:

i) a microthin film membrane supported by said substrate such that said sensor array is an array of microthin film windows;

ii) a first wire disposed on said microthin film membrane, said first wire acting as a heater and a first thermometer; and

iii) a second wire spaced apart from said first wire and disposed on said substrate, said second wire acting as a second thermometer.

117. (New) An apparatus for characterizing material properties in a materials library, comprising:

a circuit board including:

a plurality of sensors disposed on said circuit board to form a sensor array, wherein each sensor in said sensor array measures at least one property of a material in the materials library;

a signal routing means; and

electronic test circuitry for sending signals to and receiving signals from said sensor array via said signal routing means, wherein the signals received by said electronic test circuitry correspond to said at least one property of a material in the materials library; and

a computer for controlling said plurality of sensors and said electronic test circuitry, receiving signals generated by said electronic test circuitry, and generating data corresponding to said at least one property of a material in the materials library and wherein at least one sensor in said sensor array comprises:

i) a microthin film membrane supported by a substrate of said circuit board such that said sensor array is an array of microthin film windows;

ii) a first wire disposed on said microthin film membrane, said first wire acting as a heater and a first thermometer; and

iii) a second wire spaced apart from said first wire and disposed on said circuit board, said second wire acting as a second thermometer.

118. (New) An apparatus for characterizing material properties in a materials library, comprising:

a circuit board including:

a plurality of sensors disposed on a substrate mounted on said circuit board to form a sensor array, wherein each sensor in said sensor array measures at least one property of a material in the materials library; and

a signal routing means to route signals to and from said plurality of sensors;

electronic test circuitry for sending signals to and receiving signals from said sensor array, wherein the signals received by said

electronic test circuitry correspond to said at least one property of a material in the materials library; and

a computer for controlling said plurality of sensors and said electronic test circuitry, receiving signals generated by said electronic test circuitry, and generating data corresponding to said at least one property of a material in the materials library and wherein at least one sensor in said sensor array comprises:

i) a microthin film membrane supported by said substrate such that said sensor array is an array of microthin film windows;

ii) a first wire disposed on said microthin film membrane, said first wire acting as a heater and a first thermometer; and

iii) a second wire spaced apart from said first wire and disposed on said substrate, said second wire acting as a second thermometer.

119. (New) An apparatus for characterizing one or more material properties for each of 5 or more samples, comprising:

a substrate having 5 or more sensors disposed thereon to form a sensor array, wherein each sensor is associated with one of said 5 or more samples and characterizes at least one thermal property of said one of said 5 or more samples;

an interconnection device electrically coupled with the sensor array; and

an electronic platform that sends signals to and receives signals from said sensor array via said interconnection device, wherein the signals received by said electronic platform correspond to said at least one thermal property and wherein at least one sensor in said sensor array comprises:

a sample support with a thermal measurement pattern disposed thereon;

a gap between said sample support and said substrate for thermally isolating said sample support from said substrate; and

a plurality of bridges connecting said sample support to said substrate over said gap.

120. (New) An apparatus for characterizing one or more material properties for each of 5 or more samples, comprising:

a substrate having 5 or more sensors disposed thereon to form a sensor array, wherein each sensor is associated with one of said 5 or more samples and characterizes at least one thermal property of said one of said 5 or more samples;

a circuit board coupled to said sensor array;

a signal routing means coupled to said sensor array via said circuit board; and

an electronic platform that sends signals to and receives signals from said sensor

array via said signal routing means, wherein said signal routing means selectively couples a sensor or a group of sensors in said sensor array to said electronic platform, and wherein the signals received by said electronic platform correspond to said at least one thermal property and wherein at least one sensor in said sensor array comprises:

a sample support with a thermal measurement pattern disposed thereon;

a gap between said sample support and said substrate for thermally isolating said sample support from said substrate; and

a plurality of bridges connecting said sample support to said substrate over said gap.

121. (New) An apparatus for characterizing one or more material properties for each of 5 or more samples, comprising:

a substrate having 5 or more sensors disposed thereon to form a sensor array, wherein each sensor is associated with one of said 5 or more samples and characterizes at least one thermal property of said one of said 5 or more samples;

a circuit board coupled to said sensor array via a connector, said circuit board having a signal routing means disposed thereon;

an electronic platform that sends signals to and receives signals from said sensor array via said signal routing means, wherein said signal routing means on said circuit board selectively couples a sensor or a group of

sensors in said sensor array to said electronic platform, and wherein the signals received by said electronic platform correspond to at least one thermal property and wherein at least one sensor in said sensor array comprises:

a sample support with a thermal measurement pattern disposed thereon;

a gap between said sample support and said substrate for thermally isolating said sample support from said substrate; and

a plurality of bridges connecting said sample support to said substrate over said gap.

122. (New) An apparatus for characterizing one or more material properties for each of 5 or more samples, comprising:

a substrate having 5 or more sensors disposed thereon to form a sensor array, wherein each sensor is associated with one of said 5 or more samples and characterizes at least one thermal property of said one of said 5 or more samples;

a circuit board including:

a signal routing means; and

electronic test circuitry for sending signals to and receiving signals from said sensor array via said signal routing means, wherein the signals received by said electronic test circuitry correspond to said at least one thermal property of said one of said 5 or more samples, and wherein said signal routing means on said circuit board selectively couples a sensor or a group of sensors in said sensor array to said electronic test circuitry; and

a computer coupled to said circuit board for controlling said signal routing means and said electronic test circuitry, receiving signals generated by said electronic test circuitry, and generating data corresponding to said at least one thermal property and wherein at least one sensor in said sensor array comprises:

a sample support with a thermal measurement pattern disposed thereon;

a gap between said sample support and a substrate of said circuit board for thermally isolating said sample support from said substrate; and

a plurality of bridges connecting said sample support to said substrate over said gap.

123. (New) An apparatus for characterizing material properties in a materials library, comprising:

a circuit board including:

a plurality of sensors disposed on said circuit board to form a sensor array, wherein each sensor in said sensor array measures at least one property of a material in the materials library;

a signal routing means; and

electronic test circuitry for sending signals to and receiving signals from said sensor array via said signal routing means, wherein the signals received by said electronic test circuitry correspond to said at least one property of a material in the materials library; and

a computer for controlling said plurality of sensors and said electronic test circuitry, receiving signals generated by said electronic test circuitry, and generating data corresponding to said at least one property of a material in the materials library and wherein at least one sensor in said sensor array comprises:

a sample support with a thermal measurement pattern disposed thereon;

a gap between said sample support and a substrate of the circuit board for thermally isolating said sample support from said substrate; and

a plurality of bridges connecting said sample support to said substrate over said gap.

124. (New) An apparatus for characterizing material properties in a materials library, comprising:

a circuit board including:

a plurality of sensors disposed on a substrate mounted on said circuit board to form a sensor array, wherein each sensor in said sensor array measures at least one property of a material in the materials library; and

a signal routing means to route signals to and from said plurality of sensors;

electronic test circuitry for sending signals to and receiving signals from said sensor array, wherein the signals received by said electronic test circuitry correspond to said at least one property of a material in the materials library, and

a computer for controlling said plurality of sensors and said electronic test circuitry, receiving signals generated by said electronic test circuitry, and generating data corresponding to said at least one property of a material in the materials library and wherein at least one sensor in said sensor array comprises:

a sample support with a thermal measurement pattern disposed thereon;

a gap between said sample support and said substrate for thermally isolating said sample support from said substrate; and

a plurality of bridges connecting said sample support to said substrate over said gap.

125. (New) An apparatus for characterizing one or more electrical transport properties for each of 5 or more samples, comprising:

a substrate having 5 or more sensors disposed thereon to form a sensor array, wherein each sensor is associated with one of said 5 or more samples and characterizes at least one electrical transport property of said one of said 5 or more samples;

an interconnection device electrically coupled with the sensor array; and

an electronic platform that sends signals to and receives signals from said sensor array via said interconnection device, wherein the signals received by said electronic platform correspond to said at least one electrical transport property

a means for generating a magnetic field pointing perpendicular to said substrate wherein said generating means comprises a magnet array having a plurality of magnets arranged in the same format as said sensors in said sensor array, wherein each magnet in said magnet array corresponds with a

sensor in said sensor array to generate a magnetic field over the corresponding sensor.

126. (New) An apparatus for characterizing one or more material properties for each of 5 or more samples, comprising:

a substrate having 5 or more sensors disposed thereon to form a sensor array, wherein each sensor is associated with one of said 5 or more samples and characterizes at least one electrical transport property of said one of said 5 or more samples;

a circuit board coupled to said sensor array;

a signal routing means coupled to said sensor array via said circuit board; and

an electronic platform that sends signals to and receives signals from said sensor array via said signal routing means, wherein said signal routing means selectively couples a sensor or a group of sensors in said sensor array to said electronic platform, and wherein the signals received by said electronic platform correspond to said at least one electrical transport property

a means for generating a magnetic field pointing perpendicular to said substrate wherein said generating means comprises a magnet array having a plurality of magnets arranged in the same format as said sensors in said sensor array, wherein each magnet in said magnet array corresponds with a sensor in said sensor array to generate a magnetic field over the corresponding sensor.

127. (New) An apparatus for characterizing one or more material properties for each of 5 or more samples, comprising:

a substrate having 5 or more sensors disposed thereon to form a sensor array, wherein each sensor is associated with one of said 5 or more samples and characterizes at least one electrical transport property of said one of said 5 or more samples;

a circuit board coupled to said sensor array via a connector, said circuit board having a signal routing means disposed thereon;

an electronic platform that sends signals to and receives signals from said sensor array via said signal routing means, wherein said signal routing

means on said circuit board selectively couples a sensor or a group of sensors in said sensor array to said electronic platform, and wherein the signals received by said electronic platform correspond to at least one electrical transport property

a means for generating a magnetic field pointing perpendicular to said substrate wherein said generating means comprises a magnet array having a plurality of magnets arranged in the same format as said sensors in said sensor array, wherein each magnet in said magnet array corresponds with a sensor in said sensor array to generate a magnetic field over the corresponding sensor.

128. (New) An apparatus for characterizing one or more material properties for each of 5 or more samples, comprising:

a substrate having 5 or more sensors disposed thereon to form a sensor array, wherein each sensor is associated with one of said 5 or more samples and characterizes at least one electrical transport property of said one of said 5 or more samples;

a circuit board including:

a signal routing means; and

electronic test circuitry for sending signals to and receiving signals from said sensor array via said signal routing means, wherein the signals received by said electronic test circuitry correspond to said at least one electrical transport property of said one of said 5 or more samples and wherein said signal routing means on said circuit board selectively couples a sensor or a group of sensors in said sensor array to said electronic test circuitry; and

a computer coupled to said circuit board for controlling said signal routing means and said electronic test circuitry, receiving signals generated by said electronic test circuitry, and generating data corresponding to said at least one electrical transport property;

a means for generating a magnetic field pointing perpendicular to a substrate of the circuit board wherein said generating means comprises a magnet array having a plurality of magnets arranged in the same format as said sensors in said sensor array, wherein each magnet in said magnet array

corresponds with a sensor in said sensor array to generate a magnetic field over the corresponding sensor.

129. (New) An apparatus for characterizing material properties in a materials library,

comprising:

a circuit board including:

a plurality of sensors disposed on said circuit board to form a sensor array, wherein each sensor in said sensor array measures at least one electrical transport property of a material in the materials library;

a signal routing means; and

electronic test circuitry for sending signals to and receiving signals from said sensor array via said signal routing means, wherein the signals received by said electronic test circuitry correspond to said at least one property of a material in the materials library; and

a computer for controlling said plurality of sensors and said electronic test circuitry, receiving signals generated by said electronic test circuitry, and generating data corresponding to said at least one electrical transport property of a material in the materials library

a means for generating a magnetic field pointing perpendicular to a substrate of the circuit board wherein said generating means comprises a magnet array having a plurality of magnets arranged in the same format as said sensors in said sensor array, wherein each magnet in said magnet array corresponds with a sensor in said sensor array to generate a magnetic field over the corresponding sensor.

130. (New) An apparatus for characterizing material properties in a materials library, comprising:

a circuit board including:

a plurality of sensors disposed on a substrate mounted on said circuit board to form a sensor array, wherein each sensor in said sensor array measures at least one electrical transport property of a material in the materials library; and

a signal routing means to route signals to and from said plurality of sensors;

electronic test circuitry for sending signals to and receiving signals from said sensor array, wherein the signals received by said electronic test circuitry correspond to said at least one property of a material in the materials library; and

a computer for controlling said plurality of sensors and said electronic test circuitry, receiving signals generated by said electronic test circuitry, and generating data corresponding to said at least one electrical transport property of a material in the materials library;

a means for generating a magnetic field pointing perpendicular to said substrate wherein said generating means comprises a magnet array having a plurality of magnets arranged in the same format as said sensors in said sensor array, wherein each magnet in said magnet array corresponds with a sensor in said sensor array to generate a magnetic field over the corresponding sensor.

131. (New) The apparatus of claims 113-124, wherein the thermal property characterized by said sensor array is at least one selected from the group consisting of heat capacity, thermal conductivity, and thermal stability.

132. (New) The apparatus of claims 113-124, wherein at least one sensor in said sensor array comprises:

a microthin film membrane supported by said substrate such that said sensor array is an array of microthin film windows; and

a heater/thermometer pattern disposed on said microthin film membrane.

133. (New) The apparatus of claim 132, wherein said microthin film membrane forming said at least one sensor is a silicon nitride membrane, and wherein said substrate supporting said silicon nitride membranes in said sensor array is a silicon wafer.

134. (New) The apparatus of claims 113-124, wherein said microthin film membrane forming said at least one sensor is a silicon nitride membrane, and wherein said substrate supporting said silicon nitride membranes in said sensor array is a silicon wafer.

135. (New) The apparatus of claims 113-124, wherein said substrate is made of a polymer sheet, and wherein said sensor array includes a plurality of heaters/thermometers disposed on said polymer sheet.

136. (New) The apparatus of claim 135, wherein said polymer sheet is a polyimide.

137. (New) The apparatus of claim 135, wherein said plurality of heaters/thermometers is printed on said polymer sheet via lithography.

138. (New) The apparatus of claim 113-124, wherein said substrate is made of a poor thermal conducting material that is at least 100 microns thick, and wherein said sensor array includes a plurality of heaters/thermometers disposed on said poor thermal conducting material.

139. (New) The apparatus of claim 138, wherein said plurality of heaters/thermometers is printed on a glass plate via lithography.

140. (New) The apparatus of claim 113-124, wherein said substrate is made of a polymer sheet.

141. (New) The apparatus of claim 113-124, wherein said substrate is made from a material having poor thermal conductivity and is placed on a heater block, and wherein said sensor array includes a plurality of temperature sensors disposed on the substrate such that a temperature difference between a first portion and a second portion of the substrate can be determined.

142. (New) The apparatus of claim 141, wherein said substrate is a glass plate.

143. (New) The apparatus of claim 113-124 wherein the at least one thermal property characterized by said sensor array is a complex dielectric constant.

144. (New) The apparatus of claim 143, wherein at least one sensor in said sensor array comprises interdigitated electrodes disposed on said substrate.

145. (New) The apparatus of claim 113-124, wherein at least one sensor in said sensor array further comprises a thermometer such that said at least one sensor can conduct a dielectric constant measurement and a thermal measurement simultaneously.

146. (New) The apparatus of claims 125, 126, 127, 128, 129 or 130, wherein the electrical transport property characterized by said sensor array is at least one selected from the group of electrical resistance, Hall coefficient, magnetoresistance, thermoelectric power, and current-voltage characteristics.

147. (New) The apparatus of claim 125, 126, 127, 128, 129 or 130, wherein at least one sensor on the sensor array comprises a plurality of electrical leads disposed on the substrate.

148. (New) The apparatus of claim 147, wherein said leads are deposited on said substrate, and wherein said material samples are deposited on top of said leads.

149. (New) The apparatus of claim 147, wherein said material samples are deposited on said substrate, and wherein said leads are deposited on top of said 5 or more samples.

150. (New) The apparatus of claim 125, 126, 127, 128, 129 or 130, wherein said generating means comprises a magnet that generates a magnetic field over the entire sensor array.

151. (New) The apparatus of claim 125, 126, 127, 128, 129 or 130, further comprising means for imposing a temperature gradient across said 5 or more samples in said sensor array.

152. (New) The apparatus of claim 125, 126, 127, 128, 129 or 130, wherein said sensors in said sensor array further measure temperature, and wherein said apparatus further comprises a plurality of temperature controlled elements to impose a temperature gradient across at least one sample in said sensor array.